Scanning the Past

Morse and the Telegraph

This month marks the bicentenary of the birth of Samuel F. B. Morse, who was born April 27, 1791, in Charlestown, Massachusetts. It seems an appropriate occasion for some reflections on the famous artist–inventor and the electrical communication system that he and his associates developed.

Morse's father, Jedediah, was a leader in the Congregational church who also authored geography books, causing his son to gain the nickname, "Geography Morse." Samuel Morse graduated in 1810 from Yale, where he acquired some knowledge of electrical science from Benjamin Silliman, Jeremiah Day, and Sereno Dwight. Morse's early career was devoted to art, and he managed to spend about four years in Europe where he was tutored in art by Benjamin West. Morse returned to Massachusetts in 1815 and enjoyed some success as a painter of portraits but not of the large historical painting he preferred. In 1825, he moved to New York City where he and other artists founded the National Academy of Design, with Morse serving as its president. In 1827, he attended lectures on the relatively new science of electromagnetism given by James F. Dana of Columbia College.

In 1829, Morse again went to Europe where he worked and studied art for nearly three more years. Among his major projects was a painting known as the Gallery of the Louvre that sold for $1200 in 1835. (In July 1982, this painting was sold for $3.25 million, reported to have been the highest price ever for an American painting at the time.) In 1832, Morse took a position as professor of painting and sculpture at New York University. He conducted two unsuccessful campaigns for mayor of New York City in 1836 and 1841.

In a frequently cited paper published in 1977, the historian of technology, Eugene S. Ferguson, stressed the importance of nonverbal thought in technology, a concept that has since become a popular interpretive theme. In his book, *Emulation and Invention,* Brooke Hindle pointed out the importance of nonverbal thought in understanding Morse's success as an inventor. Hindle noted that Morse's exceptional ability to think spatially and to visualize in his mind alterations in paintings also became manifest in his work on telegraphic devices and systems.

Morse used his art studio at New York University as a telegraph laboratory for his early experiments. He received important assistance from Leonard D. Gale, professor of geology and mineralogy at the university. Gale helped with construction of batteries and informed Morse of related work by Joseph Henry, a leading American authority on electromagnetism.

Alfred Vail, who graduated from New York University in 1836, became a participant in development of the Morse telegraph in September 1837. Members of the Vail family owned the Speedwell Ironworks in Morristown, New Jersey, and they provided both financial and technical assistance to the project. The first public demonstration of the Morse system took place in January 1838 at Speedwell, with signals received over a two-mile line. (The significance of this demonstration was recognized as an electrical engineering milestone in a dedication ceremony at Historic Speedwell in May 1988. This was part of an ongoing milestone program supervised by the IEEE History Committee and administered by the Center for History of Electrical Engineering.)

Morse received a telegraph patent in 1840 and in 1843 was recipient of a $30 000 grant from the federal government to be used to build a telegraph line between Washington, D.C. and Baltimore, Maryland. The famous "What hath God Wrought" message was transmitted over this line on May 24, 1844. Morse's effort to sell his system to the United States government failed, and the Magnetic Telegraph Company was founded in 1845 to being building a telegraphic network. By 1848, every state east of the Mississippi except Florida was linked by telegraph lines, and there were more than 23 000 miles of telegraph wire in the United States by 1852. Morse disclosed in 1853 having received $193 000 in income from telegraphy as a shareholder in several firms. The Western Union Company, formed in 1856, achieved dominance in American telegraphy in the post Civil War period and handled 92 per cent of telegraphic traffic in 1880. The first transcontinental telegraph line was completed in October 1861. (This achievement also was recognized as an electrical engineering milestone at a dedication ceremony at the Fort Laramie National Historic Site in Wyoming in August 1990.)

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The telegraph served an important command and control function for both sides during the American Civil War. Telegraphic communication also facilitated control of railroad traffic, news gathering, time standardization, and numerous other business and governmental activities. The Western Union president, William Orton, told a congressional committee in 1870 that the "telegraph lives upon commerce" and "it is the nervous system of the commercial system."

The first transatlantic telegraph cable was completed in 1858, although it failed after a few weeks. After the Civil War, a new transatlantic cable was laid successfully in 1866. (This extraordinary technological achievement was recognized as an international electrical engineering milestone in a ceremony at the Heart's Content cable station in Newfoundland, Canada, in June 1985.)

Samuel Morse died in 1872, but he had lived to see the installation of a network of telegraph lines and cables connecting cities and towns around the world. The time required to communicate between London and New York City has been reduced from approximately two weeks to the speed of electrical impulses through a submarine cable. Morse's telegraph and the Morse code established the precedent of the binary mode of information exchange that has become so ubiquitous in our own age of digital computers and telecommunications networks. Perhaps some older readers still remember a time when it was common practice to send important personal messages by telegram and when the Western Union office was a communication center in every city and town.

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